Title Page

(1) **Title of Research Project:** LIQUID CRYSTALLINE DENDRIMERS.

(2) **Name of Principal Investigator** Valery P. Shibaev

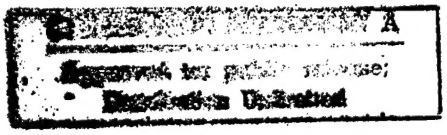
(3) **Name of Contractor** Valery P. Shibaev

(4) **Contract number** № 68171-97-M-5822

(5) **SECOND INTERIM REPORT**

(6) January 1998- March 1998

(7) The Research reported in this document has been made possible through the support and sponsorship of the U.S. Government through its European Research Office of the U.S. Army. This report is intended only for the internal management use of the Contractor and U.S. Govetnment.



REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave Blank)	2.REPORT DATE	3. REPORT TYPE AND DATES COVERED
	07 July 1998	**2nd interim report** (January 1998- March 1998)

4. TITLE AND SUBTITLE **LIQUID CRYSTALLINE DENDRIMERS. 2. Synthesis of four generations of carbosilane LC dendrimers with terminal methoxyphenylbenzete groups. Study of phase behaviour structure and mobility of mesogenic groups of LC dendrimers.**

5. FUNDING NUMBERS
C N68171-97-M-5822
WU 2

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MSU ERO C 2IR/98

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

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10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

Distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

Carbosilane LC dendrimers of generation 1-4 with 8, 16, 32 and 64 terminal phenyl benzoate mesogenic groups were synthesized all LC dendrimers with methoxyphenyl benzoate mesogenic groups of generation first to four the included are crystallized as opposite to the ones with the cyanobyphenyl groups. Small angle X-ray scattering (SAXS) of LC dendrimers with cyanobiphenyl groups of generations first to fourth revealed disordered or thogonol or weakly tilted mesophases (smectics A and C) in this seria of LC dendrimers. Molecular mobility of mesogenic groups in LC dendrimers of first generation with different mesogenic groups were studied by means of electrooptical birefringence method (Kerr effect).

14. SUBJECT ITEMS

Liquid Crystals, Dendrimers, Liquid Crystalline Dendrimers, Synthesis, Hydrosililation, Smectics, Cyanobiphenil Mesogenic Groups, Structure, Kerr Effect

15. NUMBER OF PAGES
3

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18.SECURITY CLASSIFICATION OF THE THIS PAGE	19.SECURITU CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	**Unclassified**	**Unclassified**	**UL**

NSN 7540-01-280-5500

Standard Form 298 (Rev-2-89)

BODY OF THE REPORT

(1) The Scientific Work done during the reporting period.

During the reporting period the scientific work was continued in fourth different aspects:

a) Synthesis of liquid crystalline (LC) dendrimers of different structure was continued. Carbosilane LC dendrimers of generation 1-4 with 8, 16, 32 and 64 terminal phenyl benzoate mesogenic groups were synthesized. Cyanobyphenyl-containing precursors with different spacer lenght (3-6 methylenic groups), capable of reacting with carbosilane allyl-containing dendritic matrixes, were produced.

b) Thermal behaviour of the new LC dendrimers synthesized seed was investigated by means of microscopy and PSC methods. It is worth to note, that all LC dendrimers with methoxyphenyl benzoate mesogenic groups of generation first to four the included are crystallized as opposite to the ones with the cyanobyphenyl groups synthesized before. In addition all of them have mesophases of smectic types over wide temperature region. The structure of these mesophases are under study by X-ray measurements now.

c) Small angle X-ray scattering (SAXS) of LC dendrimers with cyanobiphenyl groups of generations first to fourth synthesized at the beginning of the contract was perporned. These investigation revealed disordered or thogonol or weakly tilted mesophases (smectics A and C) in this seria of LC dendrimers. Structure of other LC dendrimers synthesized are under investigation now.

d) Molecular mobility of mesogenic groups in LC dendrimers of first generation with different mesogenic groups were studied by means of electrooptical birefringence method (Kerr effect). The results showed that terminal mesogenic groups orients in the electric field independantly each other like it happens in low molar liquid crystals. Measurements on the other generations of LC dendrimers are in progress.

No scientific meetings related to the Project were attended in this period.

Paper entitled «Kerr effect in solutions of carbosilane dendrimers with the terminal mesogenic groups» by E.I. Rjumtsev, N.P. Evlampieva, A.V. Lezov, S.A. Ponomarenko, N.I. Boiko, V.P. Shibaev was submitted to the journal «Liquid Crystals».

Abstract for the poster presentation was submitted to the WORKD POLYMER CONGRESS, which will be held in Australia on July 21-25 1998.

(2) Research plans for remainder of the contract period

1. Synthesis of LC dendrimers.

a) Synthesis of at least five generations of carbosilane LC dendrimers with cholesteryl) terminal mesogenic groups.

b) Synthesis of LC dendrimers with different spacer length (3, 4, 5, 6 methylenic groups).

c) Synthesis of LC dendritic statistical copolymers.

2. Study of phase behavior and structure of all LC dendrimers by the optical polarizing microscopy, DSC and X-ray methods.

3. Investigation of molecular properties of solutions of LC dendrimers.

(3) During the reported period no significant administrative actions were made.

(4)